whereby "galvanized iron" is said to be prepared. And it is a curious fact, that when zinc is even merely kept in contact with iron, it will protect the iron from rust, and thus iron nails may be used with zinc sheeting, though nails of zinc itself are best of all, inasmuch as all galvanic action is thus prevented, whereas even with iron, though the iron, as the less electro-positive or more electro-negative metal, will be protected by an exaltation of the negative, it must, or at least would be, at some small expense of zinc, from an equivalent increase of its tendency to oxidize, were it not that the first slight scurf of grey oxide on its surface forms a firm, resistive, and complete coat of mail, protecting itself from all further injury by oxidation from ordinary causes. Zinc, in fact, is thus a most singular and anomalous mass of contradictory properties. Chemically speaking, it so greedily devours oxygen, that it will strip even iron of it, yet we see how completely it can protect its own substance from this very tendency to oxidize, and this, too, from its very strength of affinity for oxygen. Chemically speaking it is so combustible, that it may be made to burn and blaze: and yet from its practical power to cover itself with a firm though thin shell or crust of stony or glassy oxide, and from the much stronger heat required to melt it, we have no doubt that it will constitute (though not a *fire-proof* material like iron or stone), a safer covering for roofs than lead at least; for though, where the ordinary inflammables have already originated a conflagration, it will much rather promote than retard the blaze, yet certainly it will protect the woodwork of roofs from sparks, and burning embers, &c., contributed by adjoining conflagrations, both by its surfacial incrustation, and by its solidity in circumstances where lead would melt and disappear, exposing the timber beneath to the burning embers.*

Bronze is another of those alloys into the composition of which zinc essentially enters. Bronze is a composition of copper, zinc, and tin, and, like brass, is of ancient origin. Bronze vessels have been found at Nineveh and also at Herculaneum. With tin alone, too, zinc forms a useful alloy. In China and India various utensils and ornaments are made of zinc, inlaid with other metals. The 'white copper' of the Chinese is a composition of zinc, copper, and nickel, the zinc 7-16ths of the whole, and the remaining 9-16ths, of copper and nickel to each other as 5 to 13. The amalgam of zinc, or its alloy with mercury, is made by trituration in a mortar. This is the metaline substance which is spread over the rubber of the electrical apparatus for creating electricity by friction. The use of zinc, also, in the galvanic circuit in connection with copper, has been already noted; but we may here remark that cast-iron, which contains the electro-negative carbon, was some time ago discovered to constitute what was regarded as an important substitute for the negative or copper-plate in the galvanic circuit. With other artificial associations of zinc with metals we have still less to do than even with some of the preceding; but we may remark, in conclusion, that while 1-200th part of platinum destroys the malleability of zinc, the mere presence of molten zinc in a crucible, side by side with molten gold, will render the gold quite brittle.

The metals with which zinc is naturally associated, and which also tend, as well as sulphur, to injure or destroy its malleability, are iron, lead, and arsenic. Probably the curious and anomalous fact, that impure, commercial, brittle, zinc, if heated to a certain temperature, will become malleable, and afterwards remain so even while cool, is attributable to arsenic or sulphur, which the heat may separate, these being both more volatile than zinc. A writer, however, remarks, that "a small per centage of iron is what renders most of the spelter, particularly English, unfit to roll."

* A case of this very kind has occurred since these remarks were in type. We quote from the *Sun* newspaper:—"While the firemen were employed upon this fire at Lincoln's-inn, an alarm was given that another had broken out in Chancery-lane, and it was ascertained that *some of the burning flakes* had been wafted by the wind upon the roof of the law chambers, No. 77 in the lane, and *having settled the gutter, had come in contact with the timber underneath, and fired the roof.* When the fire brigade arrived with their engines, the flames were raging with such fury that the two roofs at the least were in great danger of being consumed." We may here append some remarks by a correspondent who writes to urge the superiority of the zinc produced by the Belgian mines, and says—With regard to its combustibility, zinc ignites only upon a blazing fire, and never when the flame merely passes over it. It is, therefore, not only "not capable of originating a fire," as you very properly state, but it will really act as a preventure to fire where the upper part of a house might otherwise be apt to take fire from a neighbouring conflagration; and this the more especially when the metal is properly laid on the roofs, that is, when the sheets are folded thus ⌐ one over the other, which will exclude any draught. It is pretty well known that fire is communicated from one house to another through the interstices of the slates or tiles, and that slates at a temperature far below the melting point of lead (say 500 deg. Fahrenheit) split, and therefore afford every facility for the entrance of the flames, so that lead would be even preferable to slates on that account; but zinc resists the action of the flames at 700 deg. Fahrenheit; and of this there was a memorable instance at the great conflagration of Guadeloupe, when several hundred houses were destroyed by fire, but those which were covered with zinc escaped, almost entirely, amidst the flames. But there certainly exists a great difference in the quality of the metals termed zinc. The commercial zinc of England is generally an amalgamation, and, in consequence, very brittle; but it is an error, which prevails only in this country, to suppose that the [impure?] metal, when heated to 300 deg. Fahrenheit, becomes and afterwards continues ductile and malleable, like pure zinc. It is well known that all amalgamated metals are brittle, and will remain so whilst in that state. I know that even the best authorities in this country say that zinc becomes powderable at 300 deg. Fahrenheit, and might crumble by its own weight, and certainly that is quite a reasonable supposition in respect to zinc of an inferior quality—for an amalgam being composed of metals which are affected in different degrees by the action of heat, those metals which are most susceptible of its influence will melt first, and thus detach themselves from the other component parts, and in this manner the crumbling which is alluded to by the English authorities is occasioned—but that cannot take place in metal prepared from the pure calamine, or ore, which does not crumble, but only becomes the more ductile until it arrives at the melting point.

NOTES IN THE PROVINCES.

The curious and interesting process, but seldom resorted to, of drawing sloping walls back to the perpendicular by means of iron rods heated and thus lengthened, and then screwed up to the outer side of the wall, cooled again, and thus shortened, pulling the declining wall back to the perpendicular, has just been carried out on the walls of Barrow Church, which were more than a foot out of the perpendicular. They were also underpinned with what was regarded as a firm foundation. Other restorations and improvements have here been effected, both externally and internally, including a new open timber chancel roof of high pitch, with grey tiles, and new gables, above, and a solid body of concrete thrown in around the building below. Carved stalls, encaustic tiles, painted window glass, and other ornamental work have also been partially made use of in the restorations, which do not yet include the nave and other parts of this edifice.——Attempts to procure the erection of a corn exchange at Bedford have been renewed, 2,000*l.* being to be raised in 10*l.* shares for the purpose.——Roxton Church has been repaired at an expense of about 1,200*l.*——The Southampton Water Works Company have received the tenders called for for laying 1,050 yards lineal of cast-iron water-pipes. They were from Mr. Butler, 46*l.* 5s., and 9½d. per yard; Mr. Eyre, 75*l.* 10s., and 1s. per yard; Mr. Emmett, 49*l.* 15s. 6d., and 9d. per yard; Messrs. Gale and Coombs, 47*l.* 10s., and 10d. per yard; Mr. Weston, 39*l.* 14s., and 8d. per yard. The tender of Mr. T. Weston, of East-street, was of course accepted.——It has been resolved to erect a church at the village of Hucclecote, near Gloucester, from designs by Mr. John Jacques, architect.——Mr. Strong, builder, of Stow-on-the-Wold, has undertaken to refit the parish church at Hooknorton, Oxon, for 585*l.* Twelve firms, says the *Gloucester Chronicle*, competed; the highest offer was 895*l.*; the lowest 499*l.* 10s.——The parish church at Runcorn, re-erected at a cost of 10,000*l.*, was consecrated on Thursday week before last.——An obituary stained glass window has been put up in the south aisle of the choir of Chester Cathedral, at a cost of 100*l.*, by the dean of Chester.——Besides the district churches already built and projected at Sheffield, subscriptions have been opened for one at Moorfields. The Pitsmoor one is to be begun early in the spring. Two church sites, one in Fenton-street and another in Coal-pit-lane, have been applied for to the town trustees. A sum has been offered towards the erection of a tower to the new church in Eldon-street.——The following is a return, by Mr. Rushton, the building-surveyor, of houses and warehouses erected, or in course of erection, within the borough of Liverpool, from 1st January to 31st December, 1848:—74, under 12*l.* per annum; 506, from 12*l.* to 25*l.*; 48, from 25*l.* to 35*l.*; 28, from 35*l.* and upwards; total, 656 houses, together with 6 warehouses. The houses erected since 1838 are as follows:—in 1835, 1,052; 1839, 997; 1840, 1,576; 1841, 1,761; 1842, 2,027; 1843, 1,390; 1,844, 2,450; 1845, 3,728; 1846, 3,460; 1847, 1,220; 1848, 656; total, 20,317.——The first stone of a bridge across the Don, at Sprotbro', near Doncaster, was laid by Lady Charlotte Copley, on Monday week. It will consist of seven arches, one of 100 feet span. Messrs. Waring, of Swinton, are the contractors.——The melodious voice of the great Peter Bell—not of Wordsworthian memory, but of York Cathedral tower—whose tongue has long lolled uselessly out of his capacious mouth, is now about to be made to tell the hours for behoof of all within hearing, by help of a weighty hammer, with clock-work power sufficient to strike him on the mouth with. The tenor in the other tower, in former use, is cracked.——On the Lancashire coast great damage has been done to property, particularly sea walls in Morecambe bay, by late strong gales and inundations of the sea. Even through the rise of the tide in the river Lune, the river overflowed, and inundated many houses and cellars, the promenade, and part of the North-Western Railway.——A water company in Sunderland supplies 400 poor families, *gratis*, with service pipes and water-taps in their houses, and with an unlimited supply of water at the rate of one penny per week. A model water company, indeed!——The workmen employed by the Derwent Iron Company, says the *Gateshead Observer*, have subscribed 50*l.* towards the erection of the new district church at Shotley-bridge.——Since the opening of the Newcastle Baths and Washhouses, in September, warm baths have been taken by 3,000 males and 260 females; plunge bath by 2,246. The washhouses have been attended by 1,341 persons.——A new hospital for children is about to be erected at Edinburgh, with money bequeathed by a Mr. Daniel Stewart, and now amounting to 90,000*l.* How many more?

RAILWAY JOTTINGS.

A correspondent, "A. S. S., Railway Inspector, Knaresborough," suggests that, for the protection of the boxes for facing points, from dust, rain, snow, &c., a cover with a short slip for the handle, over the long one in which it works, should be locked upon it, unless when worked, in which case it might be so adjusted as to be readily pushed back, to allow the free working of the handle till again drawn over the open slip, and locked as before.——Under Lord Campbell's Act regarding compensation in railway accidents an important case has just been settled by jury at Dundee, in which a Mrs. Cargill laid damages at 5,000*l.* for the loss of her husband, a farmer. The Company (the Dundee and Perth) compromised the case by settling 75*l.* a year on the widow for life.——"A case," says the *Cambridge Chronicle*, "was lately decided in one of the courts by which it is now ruled that husbands who lose their wives by railway accidents can only claim, in compensation, the amount of any income which may have been cut short by their death. Thus, 'virtuous women, who were only crowns to their husbands,' will be valued, according to the tombstone cutter's rule, at five shillings. It has been suggested that at railway stations, beside the 'ladies' refreshment room,' there should be a 'ladies' valuation room,' with a proper officer in attendance. As the ladies pass, scenes of the following tenor, it is supposed, would pass also. 'What sort of a wife are you, ma'am?'—'Sir?' 'Of what value are you to your husband?'—'Your question is very impertinent, Sir. I believe, although I did not bring my husband a shilling, he would be filled with deep sorrow were he to lose me.' 'O, we have nothing to do with that, ma'am—sorrow does not enter into railway calculations. You may pass.' Another enters—'Pray, ma'am, how does your husband estimate you?' 'You are as great a brute as my husband, I believe, and that is saying a great deal. I bring him ten thousand a year, which goes back to my relations if I die, as we have no children, and yet the wretch uses me worse than ——.' 'Station-master! quick, quick! Get a special train instantly for this lady, and